AP-051

General Correspondence

YEAR(S): 2006-2010

AP051

ENSR | AECOM

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May 7, 2007

Mr. Glenn Von Gotten
State of New Mexico
Oil Conservation District
1220 South St. Francis Drive
Santa Fe, NM 87505

Subject: Maverik Kirkland Site

Dear Mr. Von Gotten,

Please find attached the Compatibility Testing Results, which were not complete at the time of groundwater results submittal in the Stage 1 Abatement Report. These testing results complete the reporting to OCD on the Kirkland site. As shown in the results, the soil – bentonite backfill material used for the slurry wall is providing hydraulic containment of impacted groundwater and soils in the former tank farm area, as it was designed to do.

Maverik typically submits the annual monitoring report in April of each year. The groundwater monitoring results for 2006 were previously reported when received in the Stage 1 Abatement report, however, and so no separate annual monitoring report will be submitted for 2006. This final submittal finishes the scope of agreed upon work, and Maverik is not intending to submit another report at this time. Maverik will schedule routine annual groundwater monitoring for the third or fourth quarter of 2007, as typically done.

Following receipt of this information, we would like to schedule a follow-up call with you to ensure that we have concluded the required investigation and reporting. Please feel free to call Dennis Riding directly at 801-335-3860 or myself at 970-493-3700 with any questions. I will follow-up with you to schedule a call within the next 10 days or so.

Sincerely yours,

Jenny K Phillips

Jenny Phillips
Toxicologist
jphillips@retec.com

cc: Dennis Riding, Maverik Country Stores, Inc.

Compatibility Test Results

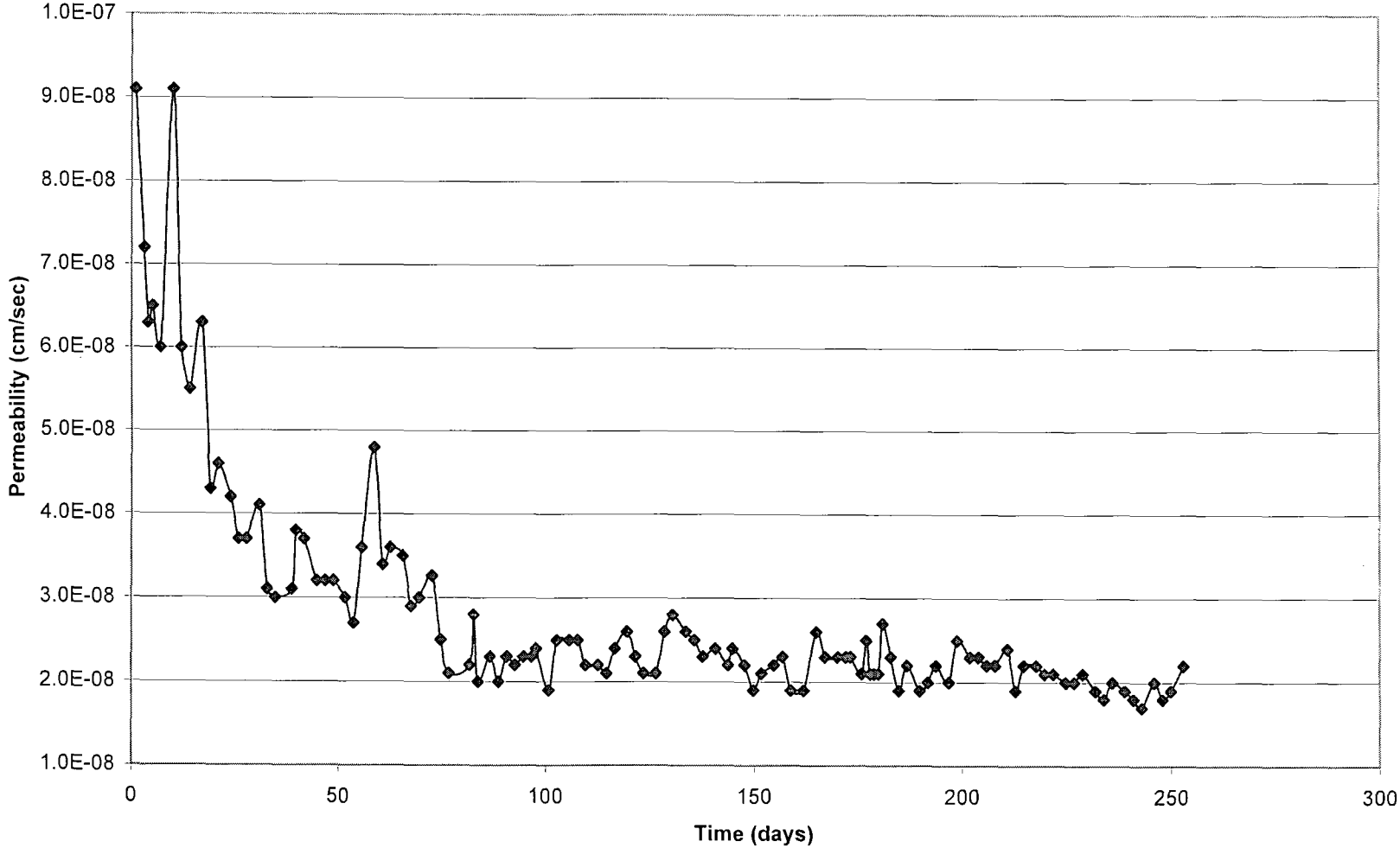
A compatibility test was conducted on one of the six soil-bentonite backfill samples (South Wall Vadose Zone) between April and December of 2006. This sample was chosen because it was sampled from the vadose zone (therefore no prior contact with impacted groundwater) and because the initial permeability of this sample using lab water ($8.8x10^{-8}$ cm/sec) was average compared to all six soil backfill samples and close to the installation target for permeability ($\leq 1x10^{-7}$ cm/sec).

Compatibility testing was used to assure that site contaminants do not compromise the effectiveness of the backfill material by increasing its permeability. This test for permeability uses impacted site water as the permeant in place of the lab water. Three pore volumes of site water passed through the sample. Lab results showing sample permeability over the nine month test period are provided as Attachment A. A graph of permeability versus time is also provided as Figure 1. As noted previously, the initial permeability of the sample using lab water was found to be $8.8x10^{-8}$ cm/sec. The permeability during the compatibility test (using contaminated site water) was $9.1x10^{-8}$ cm/sec at the start of the test and decreased to $2.2x10^{-8}$ cm/sec by the completion of the test (after three pore volumes).

Results from the compatibility test on the South Wall Vadose Zone sample show a slight decrease in permeability during the first few months of the test. This can likely be attributed to further hydration of the bentonite in the soil-bentonite backfill. After the first few months, the permeability became relatively stable at approximately $3.0x10^{-8}$ cm/sec. The soil-bentonite backfill for the slurry wall shows no signs of an incompatibility with impacted site groundwater, and will likely have no incompatibility in the future.

The results of the compatibility testing along with the permeability test results demonstrate that the soil-bentonite backfill material used for the slurry wall at the Maverik Kirtland site is providing good hydraulic containment of impacted groundwater and soils in a former tank farm area. The compatibility test results are an indicator that the soil-bentonite backfill material will continue to maintain a permeability less than $1x10^{-7}$ cm/sec with no foreseeable increase in permeability or reduction of the effectiveness of the slurry wall as a groundwater containment remedy for the site.

Figure 1
Maverik Kirtland Site - Slurry Wall Integrity Demonstration
Compatibility Test Results



Attachment A

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD
ASTM D 5084

CLIENT	The Retec Group	JOB NO.	2570-15
BORING NO.	SW Wall Vadose	SAMPLED	3-29-06
DEPTH		TEST STARTED	4-06-06 CAL
SAMPLE NO.		TEST FINISHED	01-01-07 BKL
SOIL DESCR.	Project#MSC01-19100-300	CELL NUMBER	4P
LOCATION	Maverik Kirtland	SATURATED TEST	Yes
CONF. PRES. PSF	576	TEST TYPE	TX/Pbp

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	451.9	450.3
Wt. Wet Soil & Pan (g)	460.2	458.6
Wt. Dry Soil & Pan (g)	377.9	377.9
Wt. Lost Moisture (g)	82.4	80.7
Wt. of Pan Only (g)	8.3	8.3
Wt. of Dry Soil (g)	369.5	369.5
Moisture Content %	22.3	21.8
Wet Density PCF	125.1	133.1
Dry Density PCF	102.3	109.3

Init. Diameter (in)	2.403	(cm)	6.104
Init. Area (sq in)	4.535	(sq cm)	29.261
Init. Height (in)	3.034	(cm)	7.706
Vol. Bef. Consol. (cu ft)	0.00796		
Vol. After Consol. (cu ft)	0.00746		
Porosity %	38.23		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CM	Permeability k cm/sec	
1380.0	82800	49.6	45.8	13.4	9.1E-08	
2880.0	172800	44.5	38.6	20.1	7.2E-08	
1440.0	86400	38.6	36.1	24.7	6.3E-08	
1440.0	86400	36.1	33.6	27.4	6.5E-08	
2880.0	172800	33.6	29.1	31.2	6.0E-08	
4200.0	252000	29.1	19.9	38.7	9.1E-08	
2880.0	172800	49.3	44.1	14.5	6.0E-08	
2880.0	172800	44.1	39.6	19.8	5.5E-08	
4260.0	255600	39.6	32.3	26.2	6.3E-08	
2880.0	172800	32.3	29.1	31.9	4.3E-08	
2880.0	172800	29.1	25.8	35.5	4.6E-08	*cleaned pore lines
4204.0	252240	49.4	44.1	14.4	4.2E-08	and pore stones.
2880.0	172800	44.1	41.0	19.0	3.7E-08	
2880.0	172800	41.0	38.0	22.3	3.7E-08	
4320.0	259200	38.0	33.2	26.6	4.1E-08	
2880.0	172800	33.2	30.9	30.5	3.1E-08	

Data entry by: CAL/SR Date: 01/10/2007
Checked by: cal Date: 1/10/07
FileName: RGP0SWWV

ADVANCED TERRA TESTING, INC.

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD
ASTM D 5084

CLIENT The Retec Group JOB NO. 2570-15

BORING NO.	SW Wall Vadose	SAMPLED	3-29-06
DEPTH		TEST STARTED	4-06-06 CAL
SAMPLE NO.		TEST FINISHED	01-01-07 BKL
SOIL DESCR.	Project#MSC01-19100-300	CELL NUMBER	4P
LOCATION	Maverik Kirtland	SATURATED TEST	Yes
CONF. PRES. PSF	576	TEST TYPE	TX/Pbp

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CM	Permeability k cm/sec	
2880.0	172800	30.9	28.7	32.9	3.0E-08	
5760.0	345600	49.3	43.9	14.6	3.1E-08	
1440.0	86400	43.9	42.3	18.4	3.8E-08	1 pore volume
2880.0	172800	42.3	39.3	20.9	3.7E-08	
4320.0	259200	39.3	35.5	24.6	3.2E-08	~1 pore volume
2932.0	175920	35.5	33.0	28.1	3.2E-08	
2880.0	172800	33.0	30.6	30.7	3.2E-08	
4320.0	259200	30.6	27.3	33.8	3.0E-08	
2881.0	172860	27.3	25.4	36.7	2.7E-08	
2879.0	172740	25.4	22.9	39.1	3.6E-08	
4320.0	259200	22.9	18.1	43.1	4.8E-08	
2880.0	172800	18.1	15.9	46.9	3.4E-08	
2760.0	165600	49.8	46.8	12.8	3.6E-08	
4326.0	259560	46.8	42.4	16.8	3.5E-08	
2880.0	172800	42.4	40.0	20.5	2.9E-08	
2880.0	172800	40.0	37.6	23.1	3.0E-08	
4320.0	259200	37.6	34.6	26.1	2.6E-08	
2890.0	173400	34.6	32.7	28.7	2.5E-08	
2880.0	172800	32.7	31.2	30.6	2.1E-08	
7200.0	432000	31.2	27.1	33.7	2.2E-08	
1440.0	86400	27.1	26.1	36.4	2.8E-08	
1440.0	86400	26.1	25.4	37.3	2.0E-08	
4320.0	259200	49.3	46.3	13.3	2.3E-08	
2880.0	172800	46.3	44.6	15.9	2.0E-08	
2880.0	172800	44.6	42.7	17.8	2.3E-08	
2880.0	172800	42.7	40.9	19.8	2.2E-08	
2880.0	172800	49.1	47.1	13.0	2.3E-08	
2880.0	172800	47.1	45.1	15.2	2.3E-08	
1440.0	86400	45.1	44.1	16.8	2.4E-08	
4320.0	259200	44.1	41.7	18.6	1.9E-08	
2880.0	172800	40.5	38.5	22.3	2.5E-08	
4320.0	259200	38.5	35.6	25.0	2.5E-08	
2880.0	172800	35.6	33.7	27.6	2.5E-08	
2880.0	172800	33.7	32.0	29.6	2.2E-08	
4320.0	259200	32.0	29.5	31.9	2.2E-08	
2880.0	172800	29.5	28.0	34.1	2.1E-08	
2880.0	172800	28.0	26.3	35.8	2.4E-08	
4320.0	259200	26.3	23.6	38.2	2.6E-08	

Data entry by: CAL/SR Date: 01/10/2007
Checked by: ___ Date: 1/10/07
FileName: RGP0SWWV

ADVANCED TERRA TESTING, INC.

SAMPLE NO.		TEST FINISHED	01-01-07 BKL
SOIL DESCR.	Project#MSC01-19100-300	CELL NUMBER	4P
LOCATION	Maverik Kirtland	SATURATED TEST	Yes
CONF. PRES. PSF	576	TEST TYPE	TX/Pbp

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CM	Permeability k cm/sec	
2880.0	172800	23.6	22.0	40.5	2.3E-08	
2880.0	172800	22.0	20.6	42.2	2.1E-08	
4320.0	259200	20.6	18.5	44.1	2.1E-08	2 pore volumes
2880.0	172800	49.2	46.9	13.0	2.6E-08	
2880.0	172800	46.9	44.5	15.6	2.8E-08	
4320.0	259200	44.5	41.3	18.6	2.6E-08	
2880.0	172800	41.3	39.3	21.5	2.5E-08	
2924.0	175440	39.3	37.4	23.6	2.3E-08	
4260.0	255600	37.4	34.6	26.2	2.4E-08	~ 2pore volumes
4390.0	263400	34.6	32.0	29.1	2.2E-08	
1440.0	86400	32.0	31.1	31.0	2.4E-08	
4320.0	259200	31.1	28.7	32.8	2.2E-08	
2880.0	172800	28.7	27.3	34.9	1.9E-08	
2880.0	172800	27.3	25.8	36.5	2.1E-08	
4320.0	259200	25.8	23.5	38.5	2.2E-08	
2880.0	172800	23.5	21.9	40.7	2.3E-08	
2880.0	172800	21.9	20.6	42.2	1.9E-08	
4380.0	262800	20.6	18.7	44.0	1.9E-08	
4320.0	259200	49.3	45.9	13.5	2.6E-08	
3000.0	180000	45.9	43.9	16.5	2.3E-08	
4320.0	259200	43.9	41.1	19.1	2.3E-08	
2830.0	169800	41.1	39.3	21.6	2.3E-08	
1573.0	94380	39.3	38.3	23.1	2.3E-08	
3960.0	237600	38.3	36.0	24.9	2.1E-08	
1500.0	90000	36.0	35.0	26.7	2.5E-08	
1440.0	86400	35.0	34.2	27.7	2.1E-08	
1440.0	86400	34.2	33.4	28.6	2.1E-08	
1440.0	86400	33.4	32.6	29.4	2.1E-08	
1440.0	86400	32.6	31.6	30.4	2.7E-08	
2880.0	172800	31.6	29.9	31.9	2.3E-08	
2880.0	172800	29.9	28.5	33.6	1.9E-08	
2896.0	173760	28.5	26.9	35.2	2.2E-08	
4260.0	255600	26.9	24.9	37.2	1.9E-08	
2866.0	171960	24.9	23.5	39.0	2.0E-08	
2880.0	172800	23.5	22.0	40.6	2.2E-08	
4320.0	259200	22.0	20.0	42.5	2.0E-08	
2877.0	172620	49.2	47.1	12.9	2.5E-08	
4491.0	269460	47.1	44.0	15.8	2.3E-08	

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ADVANCED TERRA TESTING, INC.

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD
ASTM D 5084

CLIENT The Retec Group

JOB NO. 2570-15

BORING NO.	SW Wall Vadose	SAMPLED	3-29-06
DEPTH		TEST STARTED	4-06-06 CAL
SAMPLE NO.		TEST FINISHED	01-01-07 BKL
SOIL DESCR.	Project#MSC01-19100-300	CELL NUMBER	4P
LOCATION	Maverik Kirtland	SATURATED TEST	Yes
CONF. PRES. PSF	576	TEST TYPE	TX/Pbp

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CM	Permeability k cm/sec	
2850.0	171000	44.0	42.1	18.5	2.3E-08	
2880.0	172800	42.1	40.3	20.5	2.2E-08	
2880.0	172800	40.3	38.5	22.5	2.2E-08	
4200.0	252000	38.5	35.7	25.0	2.4E-08	
2880.0	172800	35.7	34.2	27.3	1.9E-08	
2880.0	172800	34.2	32.5	29.0	2.2E-08	
4320.0	259200	32.5	30.0	31.3	2.2E-08	
2880.0	172800	30.0	28.5	33.5	2.1E-08	3 pore volumes
2880.0	172800	28.5	27.0	35.2	2.1E-08	
4320.0	259200	27.0	24.9	37.1	2.0E-08	
2880.0	172800	24.9	23.5	39.0	2.0E-08	
2880.0	172800	23.5	22.1	40.5	2.1E-08	
4320.0	259200	22.1	20.2	42.3	1.9E-08	
2880.0	172800	20.2	19.0	44.0	1.8E-08	
2880.0	172800	19.0	17.7	45.4	2.0E-08	
4320.0	259200	17.7	15.9	47.1	1.9E-08	
2947.0	176820	15.9	14.8	48.7	1.8E-08	
2880.0	172800	14.8	13.7	49.9	1.7E-08	
4430.0	265800	13.7	11.8	51.5	2.0E-08	
2880.0	172800	11.8	10.7	53.1	1.8E-08	
2880.0	172800	10.7	9.6	54.3	1.9E-08	
4444.0	266640	47.9	45.0	14.8	2.2E-08	~ 3 pore volumes

Estimated final volume 218.7 cc
Estimated porosity 40%
3 pore volumes~262.4 cc

Actual final volume 211.2 cc
Actual porosity 38.2%
3 pore volumes 242.0 cc

Volume through sample 270.5 cc

Data entry by: CAL/SR Date: 01/10/2007
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ADVANCED TERRA TESTING, INC.

TRIAXAL COMPRESSION TEST DATA

CLIENT	The Retec Group	JOB NO.	2570-15
BORING NO.	SW Wall Vadose	SAMPLED	3-29-06
DEPTH		TEST STARTED	4-06-06 CAL
SAMPLE NO.		TEST FINISHED	01-01-07 BKL
SOIL DESCR.	Project#MSC01-19100-300	CELL NUMBER	4P
LOCATION	Maverik Kirtland	SATURATED TEST	Yes
CONF. PRES. PSF	576	TEST TYPE	TX/Pbp

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.3	13.6				
50.0		15.6	15.7	34.5	44.3	9.8	0.98

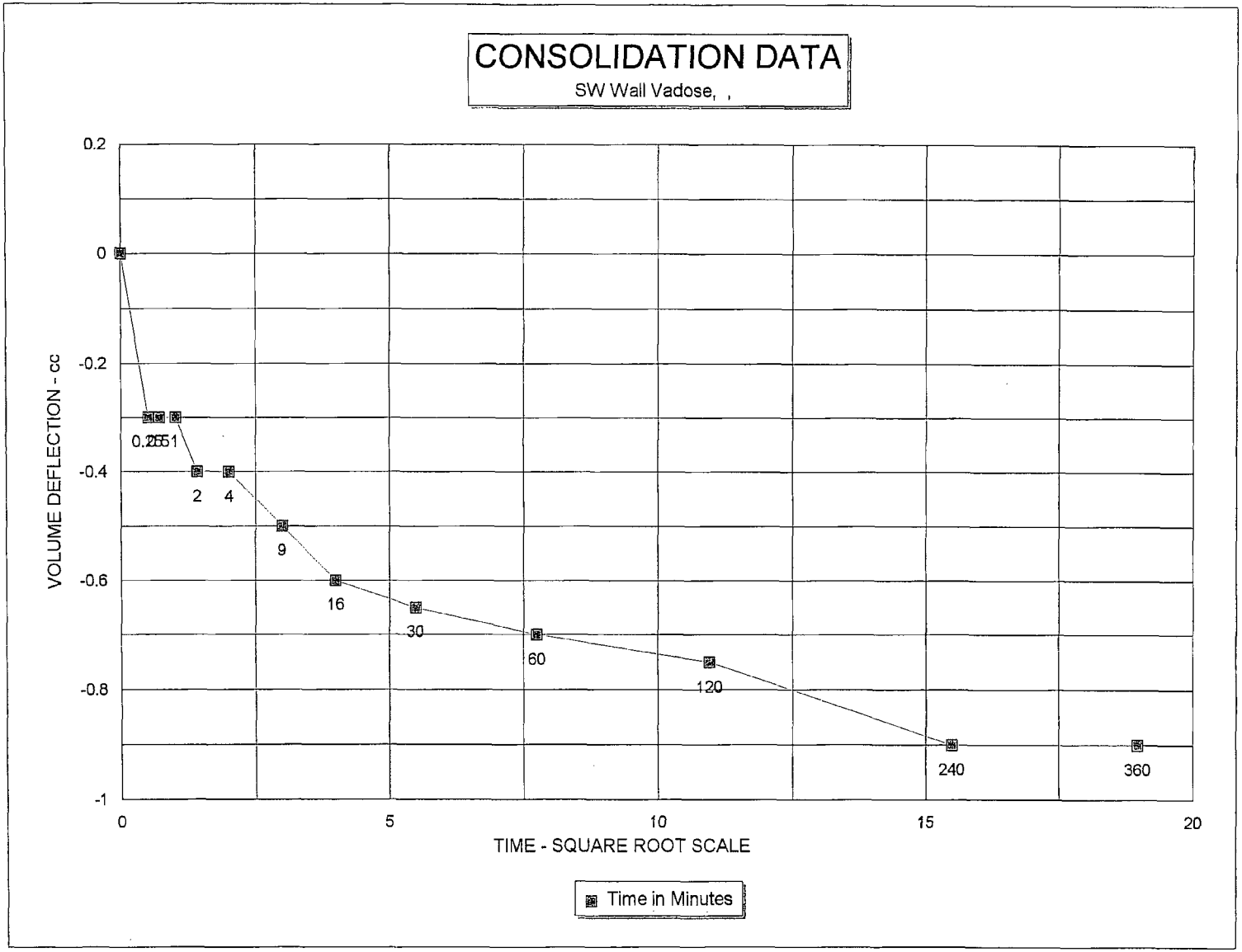
CONSOLIDATION DATA

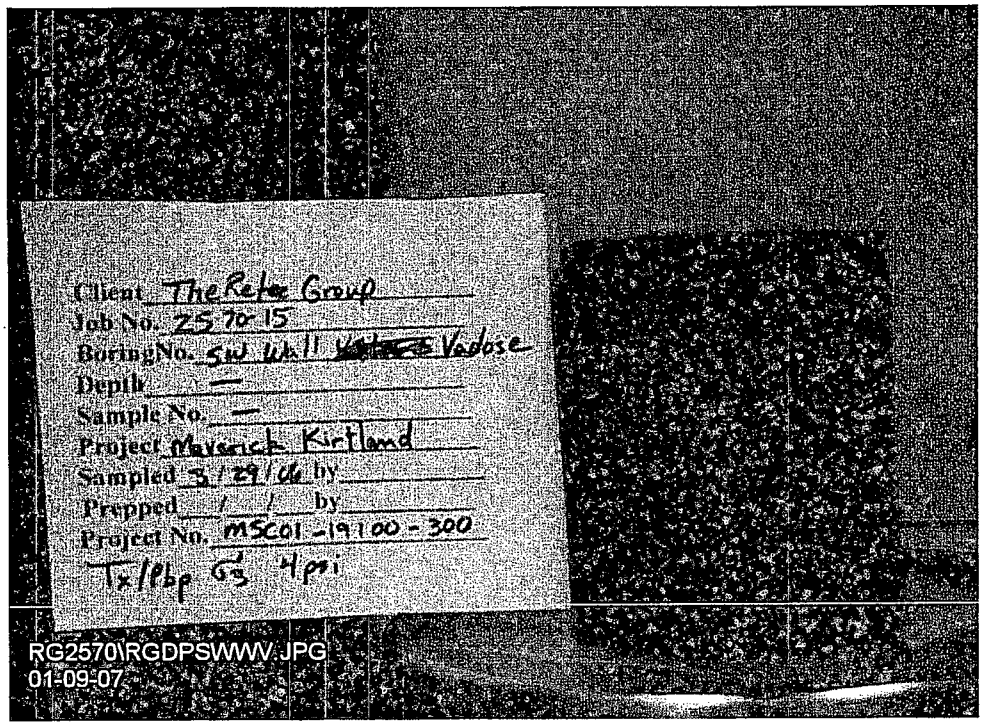
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (CC)
0.00	0.00	15.70	0.00
0.25	0.50	16.00	-0.30
0.5	0.71	16.00	-0.30
1	1.00	16.00	-0.30
2	1.41	16.10	-0.40
4	2.00	16.10	-0.40
9	3.00	16.20	-0.50
16	4.00	16.30	-0.60
30	5.48	16.35	-0.65
60	7.75	16.40	-0.70
120	10.95	16.45	-0.75
240	15.49	16.60	-0.90
360	18.97	16.60	-0.90

Initial Height (in)	3.034	Init. Vol. (CC)	225.52
Height Change (in)	0.152	Vol. Change (CC)	21.80
Ht. After Cons. (in)	2.882	Cell Exp. (CC)	7.45
Initial Area (sq in)	4.535	Net Change (CC)	14.35
Area After Cons. (sq in)	4.471	Cons. Vol. (CC)	211.17

Data entry by: CAL/SR Date: 01/10/2007
Checked by: cwe Date: 1/10/07
FileName: RGP0SWWV

ADVANCED TERRA TESTING, INC.


CONSOLIDATION DATA
SW Wall Vadose, ,
VOLUME DEFLECTION - cc
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0.25
1
2
4
9
16
30
60
120
240
360
0
5
10
15
20
TIME - SQUARE ROOT SCALE
Time in Minutes


Client The Reter Group
Job No. 25 70 15
Boring No. SW Well Vadose
Depth —
Sample No. —
Project Maverick Kirkland
Sampled 3/29/06 by
Prepped / / by
Project No. MSC01-19100-300
Tx/Pbp GS 4psi
RG2570\RGDPSWWV.JPG
01-09-07